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**SCIENTIFIC NOTE**

# THE GULF WIREWORM IN CALIFORNIA (COLEOPTERA: ELATERIDAE)

*Conoderus amplicollis* (Gyll.) or Gulf wireworm, formerly known as *Heteroderes laurentii* Guer. was first recorded as a pest of vegetables and potatoes in Alabama in 1927 (Cockerham and Deen, 1936, J. Econ. Entomol. 29: 288–296). In 1954, M. C. Lane (Co-op. Insect Report 12: 244) noted that it was distributed along the Gulf Coast from Florida to Houston, Texas and north along the Atlantic Coast to Charleston, South Carolina. He also reported that it was well known in South America and in the West Indies.

Discovered in Los Angeles County, California in 1938, *C. amplicollis* has now spread to 15 countries from the southernmost to as far north as Butte County (Stone, 1975, Coleopt. Bull. 29(3): 163). It is also present in Arizona (Tuscon, Phoenix and Yuma). Adult specimens from these localities were collected in the period 1958 to 1969. In addition, the writers have specimens from Las Vegas, Nevada; Honolulu, Hawaii; and Mexico, collected between 1961–69.

Descriptions of all stages as well as detailed life history studies have been reported on by Cockerham and Deen (1936) (photographs of the various stages are shown in Figures 1–4.). In Alabama they report damage to white potatoes as high as 25% and that they are also a serious pest of corn, snap beans, and small grains. Soil samples taken in potato fields showed as many as 8.5 larvae per sq ft.

The presence of *C. amplicollis* at Riverside and Olive, California permitted the writers to obtain preliminary data on its abundance and the effect of possible climatic change on the biology of this insect in California. That this species has become well established in certain areas was indicated by the recovery of wireworms by the junior author in his garden plot near Olive. Of 17 larvae dug up during the winter 1976 and the early spring 1977 and reared on wheat, 15 emerged as adults between March 25 and June 17, 1977.

Adult activity was determined by operating a 15 watt florescent blacklight at two locations. In Riverside the site was a weedy field formerly planted to citrus. A similar trap was installed in an avocado grove located four miles west of Olive, about 30 miles north of Riverside. Collections of adults at both localities in the five year period 1974–78 were minimal (Table 1) which seems to be an indication that this species is not overly attracted to artificial light. Cockerham and Deen (1936) also noted that the adult does not fly directly to a light and that during their flight period may be found adjacent to lighted windows crawling about on the sidewalk apparently searching for hiding places.

Table 1. Monthly catches of *Conoderus amplicollis* adults at black light. Riverside and Olive, California 1974–78.

| Riverside Year | June | July | Aug. | Sept. | Total |
|---|---|---|---|---|---|
| 1974 | | 12 | 3 | 4 | 19 |
| 1975 | | 2 | 3 | 2 | 7 |
| 1976 | 10 | 65 | 28 | 51 | 154 |
| 1977 | | 6 | 56 | 5 | 67 |
| 1978 | 4 | 32 | 4 | | 40 |
| Total | 14 | 117 | 94 | 62 | 287 |
| % | 4 | 41 | 33 | 22 | |
| Olive | | | | | |
| 1974 | | | 4 | 17 | 21 |
| 1975 | | 6 | 15 | 3 | 24 |
| 1976 | 11 | 4 | 4 | 35 | 54 |
| 1977 | 1 | 27 | 88 | 9 | 125 |
| 1978 | 20 | 142 | 28 | | 190 |
| Total | 32 | 179 | 139 | 64 | 414 |
| % | 8 | 43 | 34 | 15 | |

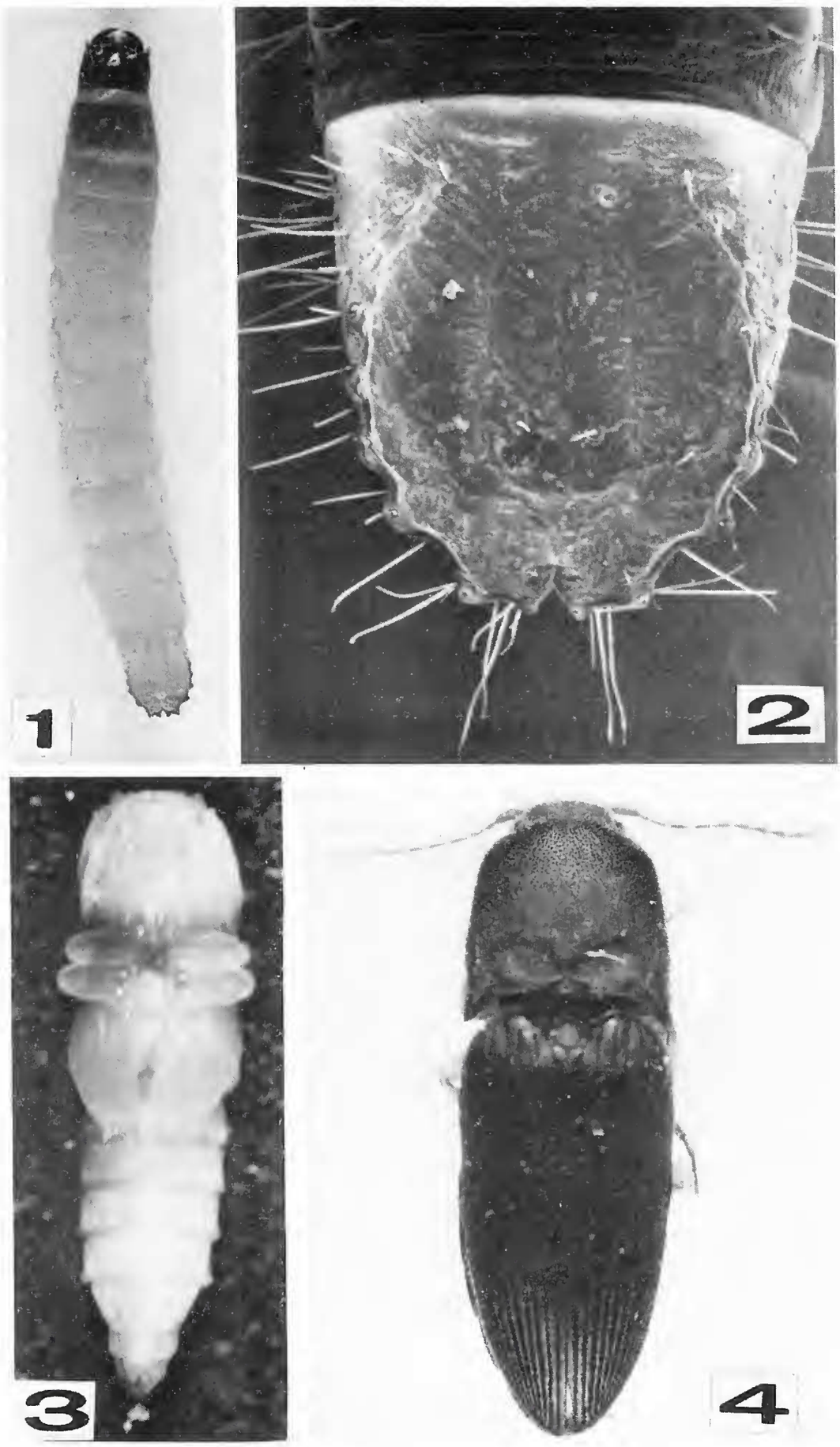
During the five year period the earliest trapping of adults at both stations occurred in 1976, on June 16 and 23 in Riverside and Olive, respectively. The last adults were trapped at Riverside on Sept. 6, 1974 and on Sept. 22, 1975 at Olive. The combined five year trap data show that the adults in both locations were most abundant in July–August.

## Life History Studies, 1977–78

Preliminary data on the duration of the stages of *C. amplicollis* was determined by confining larvae hatched on May 5, 1977 individually in two ounce tin containers containing moist 30 mesh soil and from two to as many as five kernels of wheat, more being required as they increased in size. The food and soil was replenished at two week intervals. The larvae were confined indoors where temperatures varied from 65 to 78°F (Table 2).

Of a group of 36 larvae, 10 pupated the same year (between July 29 and September 28) for an average larval period of 114 days. Nine larvae overwintered and pupated the following year (in the period April 19 to June 13), for an average larval period of 382 days. The remaining 17 individuals died during the larval stage for reasons unknown.

Cockerham and Deen (1936) reported that larvae in southern Alabama hatching from eggs in June became full-grown by November and overwintered as larvae. Pupation occurred between April and June, the larval period




Figs. 1–4. *Conoderus amplicollis* (Gyll.). Fig. 1. Larva, dorsal view, ×5. Fig. 2. Larva, dorsal plate of ninth abdominal segment, ×30. (Courtesy of Jack Imbriana, U.C.R., Riverside.) Fig. 3. Pupa, ventral view, ×7. Fig. 4. Adult, female, ×8.

Table 2. Duration of larval and pupal stages of the Gulf wireworm which hatched May 5, 1977.

| | Larval stage | | | | |
|---|---|---|---|---|---|
| | Larvae hatched & pupated same year | | | Larvae pupated second year | |
| Specimens | Range | Average | Specimens | Range | Average |
| Number | Days | Days | Number | Days | Days |
| 10 | 85–146 | 114 | 9 | 350–405 | 382 |
| | | Pupal stage | | | |
| 7 | 10–13 | 11.8 | 8 | 13–18 | 15 |

averaging 316 days. Higher temperatures and the presence of ample food in Riverside may have accounted for the greater percentage of pupations the first year.

The pupal period varied from an average of 12 days for those maturing in the fall of the first year to 15 days for those completing development at lower temperatures in May–June of the second year.

The adults of this species are extremely hardy. Of three adults which matured September 2 confined in a glass container with sliced carrots, one remained alive until January 16, or a period of 4.5 months. One died March 13 after 6.4 months and the third specimen died June 15 after 7.8 months. To our knowledge no other Elaterid adult has survived for such a long period.

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